

CLAIMS:

1. A method of making processed meat products comprising:
feeding a plurality of input food ingredient streams having different compositions;
measuring at least one compositional characteristic of at least one of said food ingredient streams;
controlling relative flow rates of the input food ingredient streams based on the measurements using a feed forward composition analysis to maintain said at least one compositional characteristic in the combined stream within a predetermined range;
directing the input food ingredient streams into a processor;
processing together the input food ingredient streams; and
producing a combined food stream from the processed input food ingredient streams having said at least one component within said predetermined range.
2. A method in accordance with claim 1 wherein the method is continuous, the duration of said processing is less than 5 minutes, and sufficient protein extraction is achieved that subsequent cooking of said combined food stream will result in a cohesive, self supporting processed meat product.
3. A method in accordance with claim 1 wherein the method is continuous, the duration of said processing is less than one minute, and sufficient protein extraction is achieved that subsequent cooking of said combined food stream will result in a cohesive, self supporting processed meat product.
4. The method of claim 1 wherein at least one of the input food ingredient streams is predominantly lean meat.

5. The method of claim 1 wherein at least one of the input food ingredient streams is predominantly fat.

6. The method of claim 1 wherein at least one of the input food ingredient streams contains a salt solution.

7. The method of claim 1 wherein at least one of the input food ingredient streams contains an aqueous nitrite solution.

8. The method of claim 1 wherein processing includes infusing a salt solution into an input food ingredient stream containing muscle tissue.

9. The method of claim 1 wherein processing includes macerating an input food ingredient stream containing muscle tissue.

10. The method of claim 1 wherein processing includes protein extraction from an input food ingredient stream containing muscle tissue.

11. An apparatus for making processed meat products comprising:
a plurality of input lines providing a plurality of input streams at least one of which input lines provides a stream containing meat;

a control system controlling flow rate through said input lines based on a feed forward analysis;

a housing within which the input streams are processed;

at least a first mixing device located within the housing; and

an output port for discharging a combined food ingredient stream.

12. The apparatus of claim 11 wherein said mixing device comprises a screw and wherein the apparatus further comprises a plurality of independent, non-continuous protrusions

located on said screw, each of said protrusions comprising a tooth having sharp edges and corners capable of puncturing meat to facilitate protein extraction, each of said teeth comprising at least one pair of generally parallel side faces and a quadrilateral end face.

13. The apparatus of claim 11 wherein one of the input streams is predominantly fat.
14. The apparatus of claim 11 wherein one of the input streams is predominantly lean meat.
15. The apparatus of claim 11 wherein at least one of the input streams is an additive stream.
16. The apparatus of claim 15 wherein the additive stream includes a salt solution.
17. The apparatus of claim 11 wherein at least one of said input streams is non-homogeneous and the control system includes at least one analyzer in-line for analyzing a compositional characteristic of said at least one non-homogeneous input stream.
18. The apparatus of claim 17 wherein the non-homogeneous input stream comprises meat.
19. The apparatus of claim 11 comprising a plurality of analyzers in-line for analyzing compositional characteristics of non-homogeneous input streams comprising meat.
20. The apparatus of claim 19 wherein the control system includes a pump or valve for each input stream.
21. The apparatus of claim 20 wherein the control system controls the relative flow rates of said input streams.
22. The apparatus of claim 21 wherein the relative flow rates are adjusted by the control system based on analysis of the compositional characteristics by the analyzers.

23. The apparatus of claim 11 comprising a pair of axially rotatable mixing devices within the housing.

24. The apparatus of claim 12 wherein each of the protrusions comprises a rectangular outer face, a pair of parallel sides intersecting said outer face, and a pair of parallel ends intersecting said sides and said outer face.

25. The apparatus of claim 24 wherein the protrusions puncture and macerate meat engaged by the mixing device, and enhance infusion of salt solution.

26. The apparatus of claim 24 wherein the mixing device includes paddles.

27. The apparatus of claim 24 wherein the mixing devices includes continuous helical screw faces.

28. A method of making a processed meat product having a first compositional characteristic within a predetermined final range comprising:

supplying a first ingredient of the processed meat product at a first flow rate;

supplying a second ingredient of the processed meat product at a second flow rate;

combining said first and second ingredients into a mixture;

measuring a second compositional characteristic of said first ingredient upstream of said combining;

maintaining the first compositional characteristic of the mixture within a predetermined intermediate range by varying one of said first and second flow rates in response to said measuring based on a correlation between said first and second compositional characteristics;

processing the mixture to produce the processed meat product with the first compositional characteristic within the predetermined final range.

29. The method of claim 28 wherein said processing includes includes cooking.
30. The method of claim 28 wherein said processing includes blending.
31. The method of claim 28 further comprising supplying a third ingredient of the processed meat product at a third flow rate, wherein said combining said first and second ingredients into a mixture further comprises combining said third ingredient into the mixture.
32. The method of claim 28 wherein said first compositional characteristic comprises fat content.
33. The method of claim 32 wherein said second compositional characteristic comprises moisture content.
34. The method of claim 28 wherein said first compositional characteristic comprises protein content.
35. The method of claim 34 wherein said second compositional characteristic comprises moisture content.
36. The method of claim 28 wherein said first compositional characteristic comprises total fat and moisture content and the second compositional characteristic comprises moisture content.